March 26, 2024

Via Federal eRulemaking Portal

Attn: EPA-HQ-OAR-2023-0434

U.S. Environmental Protection Agency
EPA Docket Center, Air Docket, Mail Code 28221T
1200 Pennsylvania Avenue NW
Washington, DC 20460

Re: Waste Emissions Charge for Petroleum and Natural Gas Systems.
Docket ID: EPA-HQ-OAR-2023-0434.

To Whom It May Concern:

Section 60113 of the Inflation Reduction Act of 2022 ("IRA") amended the Clean Air Act ("CAA") by adding Section 136, "Methane Emissions and Waste Reduction Incentive Program for Petroleum and Natural Gas Systems." Section 136(c) of the CAA, as amended, directs the Administrator of EPA to impose and collect a "Waste Emissions Charge" ("WEC") on methane emissions, also known as "fugitive emissions," that exceed statutory emissions thresholds from certain oil and gas production facilities. On January 26, 2024, the U.S. Environmental Protection Agency ("EPA") published a notice of proposed rulemaking, "Waste Emissions Charge for Petroleum and Natural Gas Systems," 89 Fed. Reg. 5318 ("Proposed Rule"), to implement Section 136(c) of the CAA as amended.

The Regulatory Impact Analysis ("RIA") of the Proposed Rule includes a discussion of the "social cost of methane" that is based on certain data and models. 89 Fed. Reg. at 5361-5363, Tables 5 and 6. Normally, a Regulatory Impact Analysis for major rulemakings under the Clean Air Act is subject to the record sufficiency standards of Section 307 of the CAA. CAA Sections 307(d)(9)(A) and (D). Section 307(d)(3) of the CAA, in turn, requires that all information, data, and methodologies on which a proposed rule under the CAA is based must be detailed in the proposed rule, as further explained in Part I of this letter. As further explained in Part II of this letter, there is a significant problem with one of the models relied upon for social cost of methane ("SCCH4") in the RIA.

We believe that the Proposed Rule does not comply with the "information" requirements of Section 307(d)(3) of the CAA and is therefore invalid as a proposed rule under the CAA. If so, the Proposed Rule must either be withdrawn, or reissued for notice and comment with information deficits corrected. We respectfully submit these comments for EPA's consideration.

I. The "Information and Data" Requirements of CAA Section 307

Under the "mini-APA" of the CAA contained in Section 307, every proposed rule under the CAA must contain a statement of basis and purpose. Section 307(d)(3) specifies in pertinent part as follows:

> The statement of basis and purpose shall include a summary of—
> (A) the factual data on which the proposed rule is based;
> (B) the methodology used in obtaining the data and in analyzing the data; and
> (C) the major legal interpretations and policy considerations underlying the proposed rule.
> [….] All data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket on the date of publication of the proposed rule.

This provision makes clear that EPA must provide sufficient information to allow for independent verification of its modeling and results. That conclusion is strongly reinformed by EPA's own "Guideline on Air Quality Models", which "serve[] to identify, for all interested parties, those modeling techniques and databases that the EPA considers acceptable." 40 C.F.R. Appendix W to Part 51, 1.0a. In the 1977 Clean Air Act Amendments, Congress mandated that EPA adopt a consistent approach to air modeling and encouraged the standardization of model applications. The "Guideline on Air Quality Models" was first published in April 1978 to satisfy these requirements by specifying models and providing guidance for their use.

For most models to be approved for use in a variety of CAA applications, they must meet several criteria, including: "*The model must be accompanied by a complete test dataset including input parameters and output results. The test data must be packaged with the model in computer-readable form*." 40 C.F.R. Appendix W to Part 51 c.A.iii (emphasis supplied). One purpose of this and other criteria is to allow EPA to independently verify reported results that have relied on models.

EPA cannot impose one set of modeling standards on state agencies and regulated entities, and use a more relaxed standard for itself. Federal courts have held that it is abuse of discretion for EPA to fail to follow its own prior standards. *See*, *e.g.*, *Western States Petroleum Ass'n* v. *EPA*, 87 F.3d 280 (9th Cir. 1996). Federal courts have also held that it is arbitrary for EPA to rely on models the reliability and predictiveness of which cannot be independently determined because of insufficient collection and correlation of empirical data. *Ohio v. United States Environmental Protection Agency*, 784 F.2d 224 (6th Cir. 1986).

While the RIA is required by executive order (Executive Order 12866) rather than by statute, the D.C. Circuit has said that "when an agency decides to rely on a cost-benefit analysis as part of its rulemaking," that analysis is reviewable. *Nat'l Ass'n of Home Builders v. EPA*, 682 F.3d 1032, 1040 (D.C. Cir. 2012). Furthermore, when an agency does rely on cost-benefit analysis as part of its rulemaking, a serious flaw undermining that analysis can render the rule unreasonable. *City of Portland v. EPA*, 507 F.3d 706, 713 (D.C. Cir. 2007). In *Owner-Operator Indep. Drivers Ass'n v. Fed. Motor Carrier Safety Admin.*, the D.C. Circuit vacated regulatory provisions because the cost-benefit analysis supporting them was based on an unexplained methodology. 494 F.3d 188, 206 (D.C. Cir. 2007).

Because the Proposed Rule explicitly relies on information in the RIA, the "data, information, and documents" referred to in paragraph (3) of Section 307(d)(3) includes information, methodology, and data in the RIA. Accordingly, there is no basis for EPA to depart from its own "Guideline on Air Quality Models" in a rulemaking subject to the exacting standards of CAA Section 307(d)(3). Such a departure should invalidate the Proposed Rule.

As explained in the next section, the information provided on the modeling used to substantiate the social cost of methane in the Proposed Rule's RIA falls well short of both EPA's own standards and those of the CAA.

II. The Information Provided about the Models Used to Calculate Social Cost of Methane in the Proposed Rule's RIA Is Insufficient to Satisfy CAA Record Sufficiency Standards.

This section focused on the use of the social cost of greenhouse gases for the purposes of quantifying the climate impacts of the proposed rule, in particular, the social cost of methane (SCCH4), which is referred to in Tables 5 and Tables 6 of the Proposed Rule. See, 89 Fed. Reg. 5362 and 5363.

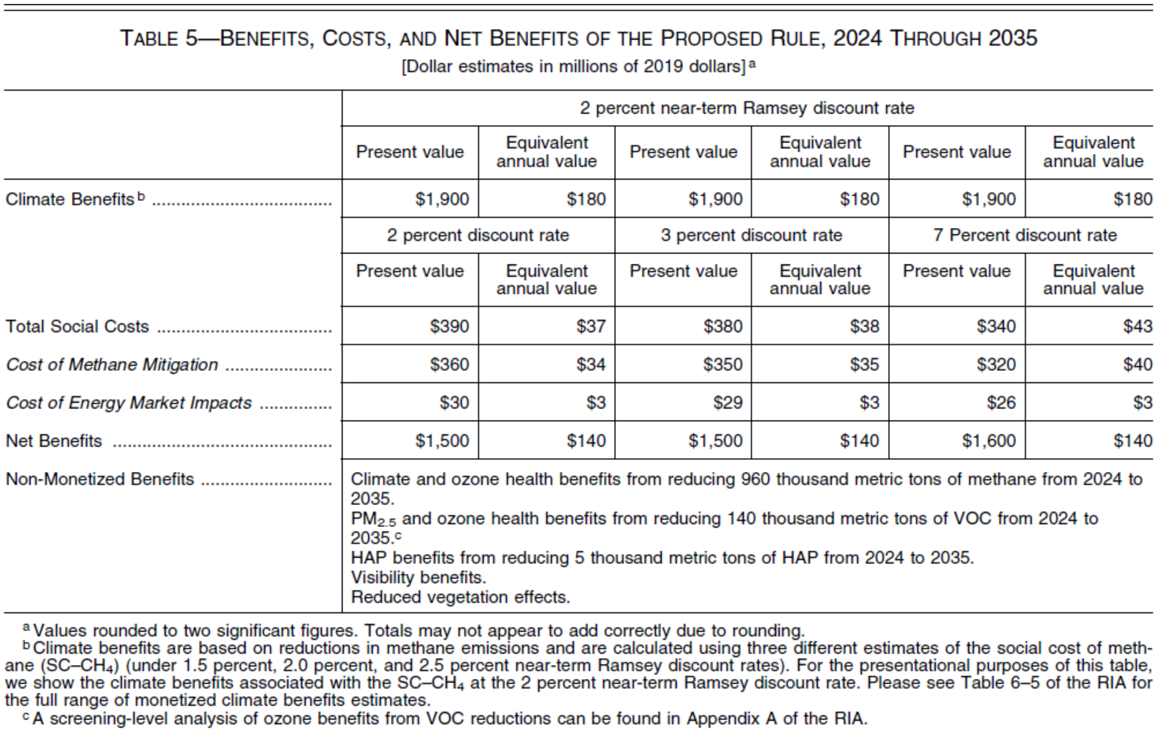

TABLE 5—BENEFITS, COSTS, AND NET BENEFITS OF THE PROPOSED RULE, 2024 THROUGH 2035

[Dollar estimates in millions of 2019 dollars][a]

	2 percent near-term Ramsey discount rate					
	Present value	Equivalent annual value	Present value	Equivalent annual value	Present value	Equivalent annual value
Climate Benefits[b]	$1,900	$180	$1,900	$180	$1,900	$180
	2 percent discount rate		3 percent discount rate		7 Percent discount rate	
	Present value	Equivalent annual value	Present value	Equivalent annual value	Present value	Equivalent annual value
Total Social Costs	$390	$37	$380	$38	$340	$43
Cost of Methane Mitigation	$360	$34	$350	$35	$320	$40
Cost of Energy Market Impacts	$30	$3	$29	$3	$26	$3
Net Benefits	$1,500	$140	$1,500	$140	$1,600	$140
Non-Monetized Benefits	Climate and ozone health benefits from reducing 960 thousand metric tons of methane from 2024 to 2035. $PM_{2.5}$ and ozone health benefits from reducing 140 thousand metric tons of VOC from 2024 to 2035.[c] HAP benefits from reducing 5 thousand metric tons of HAP from 2024 to 2035. Visibility benefits. Reduced vegetation effects.					

[a] Values rounded to two significant figures. Totals may not appear to add correctly due to rounding.

[b] Climate benefits are based on reductions in methane emissions and are calculated using three different estimates of the social cost of methane (SC–CH_4) (under 1.5 percent, 2.0 percent, and 2.5 percent near-term Ramsey discount rates). For the presentational purposes of this table, we show the climate benefits associated with the SC–CH_4 at the 2 percent near-term Ramsey discount rate. Please see Table 6–5 of the RIA for the full range of monetized climate benefits estimates.

[c] A screening-level analysis of ozone benefits from VOC reductions can be found in Appendix A of the RIA.

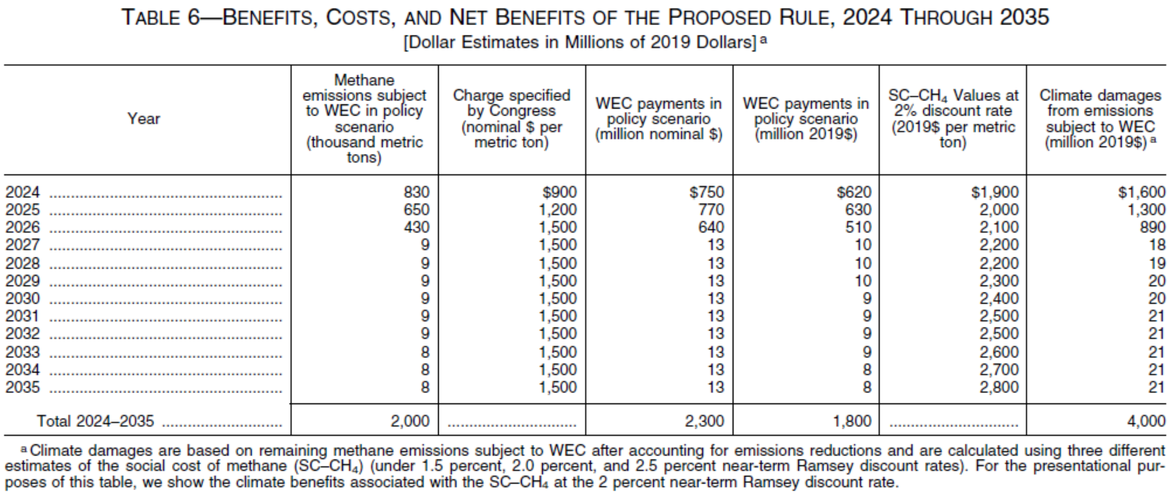

TABLE 6—BENEFITS, COSTS, AND NET BENEFITS OF THE PROPOSED RULE, 2024 THROUGH 2035

[Dollar Estimates in Millions of 2019 Dollars][a]

Year	Methane emissions subject to WEC in policy scenario (thousand metric tons)	Charge specified by Congress (nominal $ per metric ton)	WEC payments in policy scenario (million nominal $)	WEC payments in policy scenario (million 2019$)	SC–CH_4 Values at 2% discount rate (2019$ per metric ton)	Climate damages from emissions subject to WEC (million 2019$)[a]
2024	830	$900	$750	$620	$1,900	$1,600
2025	650	1,200	770	630	2,000	1,300
2026	430	1,500	640	510	2,100	890
2027	9	1,500	13	10	2,200	18
2028	9	1,500	13	10	2,200	19
2029	9	1,500	13	10	2,300	20
2030	9	1,500	13	9	2,400	20
2031	9	1,500	13	9	2,500	21
2032	9	1,500	13	9	2,500	21
2033	8	1,500	13	9	2,600	21
2034	8	1,500	13	8	2,700	21
2035	8	1,500	13	8	2,800	21
Total 2024–2035	2,000		2,300	1,800		4,000

[a] Climate damages are based on remaining methane emissions subject to WEC after accounting for emissions reductions and are calculated using three different estimates of the social cost of methane (SC–CH_4) (under 1.5 percent, 2.0 percent, and 2.5 percent near-term Ramsey discount rates). For the presentational purposes of this table, we show the climate benefits associated with the SC–CH_4 at the 2 percent near-term Ramsey discount rate.

These models are referenced in the RIA of the Proposed Rule.[1] Three models are mentioned that arrive at this conclusion – the Data-driven Spatial Climate Impact Model (DSCIM) model, the Greenhouse Gas Impact Value Estimator (GIVE) model, and the Howard and Sterner metanalysis model.

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[1] US EPA, "Regulatory Impact Analysis of the Proposed Waste Emissions Charge," https://www.epa.gov/system/files/documents/2024-01/wec_ria.pdf (accessed March 26, 2024).

We have downloaded the associated codes for these models and have a number of concerns. One such concern is the unavailability of computer codes necessary to be able to reproduce the damage function coefficients in the DSCIM model. The actual coefficients for the damage function are provided in the provided codes.[2] However, there is no code provided to ascertain the accuracy of these estimates, obtained via linear regression according to the model's documentation.[3] We corresponded with EPA staff regarding providing the codes for reproducing these coefficients, but staff only referred us to the Climate Impact Lab. *See* Attachment A to this comment letter.

The EPA has made mistakes in its social cost of carbon modeling before and it is important that all codes and data be provided to the public in order to check the accuracy and robustness of results.[4] Additionally, by not providing the codes to estimate these coefficients, it is impossible to conduct proper robustness analysis and test sensitivity to important assumptions.

Most fundamentally, as a result of EPA's failure to provide access to the codes associated with the estimation of the damage functions, it is not possible to check critical components of the damage function outlined in the DSCIM documentation. These include the subcomponents of the damage function, including coastal, agricultural, mortality, energy, and labor related damages. Damage functions as delineated in the DSCIM model documentation are outlined below.[5]

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[2] "USEPA/scghg," https://github.com/USEPA/scghg/tree/main/DSCIM

[3] The Climate Impact Lab, "Documentation for Data-driven Spatial Climate Impact Model (DSCIM)" https://github.com/USEPA/scghg/blob/main/DSCIM/DSCIM_User_Manual.pdf

[4] Howard Shelanski, "Refining Estimates of the Social Cost of Carbon, " https://obamawhitehouse.archives.gov/blog/2013/11/01/refining-estimates-social-cost-carbon

[5] The Climate Impact Lab, "Documentation for Data-driven Spatial Climate Impact Model (DSCIM)" https://github.com/USEPA/scghg/blob/main/DSCIM/DSCIM_User_Manual.pdf

C.1 Mortality

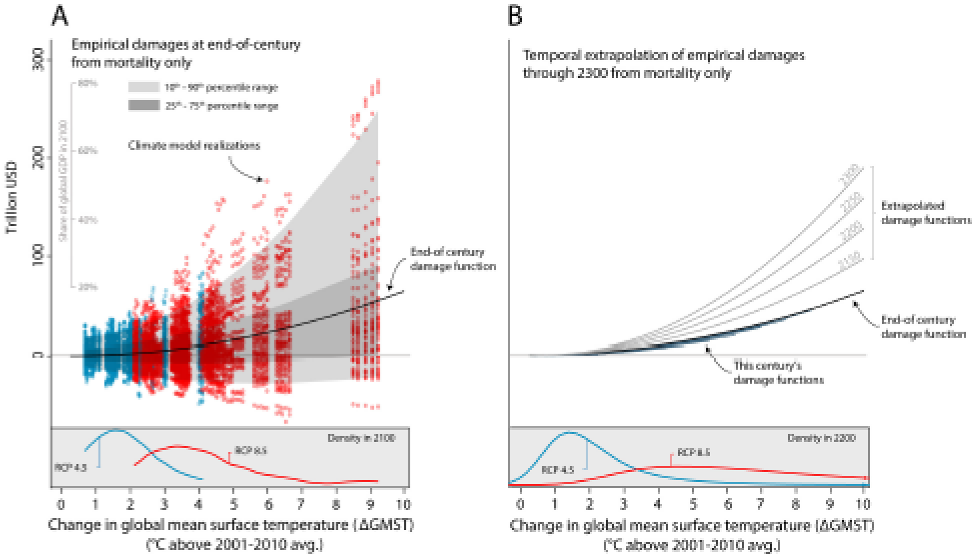

Figure 6: Empirically derived mortality-only damage functions Both panels show damage functions relating empirically derived total global mortality damages to anomalies in global mean surface temperature (ΔGMST) under socioeconomic scenario SSP3. In panel A, each point (red = RCP8.5, blue = RCP4.5) indicates the value of the full mortality risk of climate change in a single year (ranging from 2095 to 2100) for a single simulation of a single climate model, accounting for both costs and benefits of adaptation. The black line is the quadratic damage function estimated through these points. The distribution of temperature anomalies at end of century (2095-2100) under two emissions scenarios across our 33 climate models is in the bottom panel. In panel B, the end-of-century damage function is repeated. Damage functions are shown in dark blue for every 10 years pre-2100, each of which is estimated analogously to the end-of-century damage function and is shown covering the support of ΔGMST values observed in the SMME climate models for the associated year. Our projection results generate mortality damages only through 2100, due to limited availability of climate and socioeconomic projections for years beyond that date. To capture impacts after 2100, we extrapolate observed changes in damages over the 21^{st} century to generate time-varying damage functions through 2300. The resulting damage functions are shown in light grey for every 50 years post-2100, each of which is extrapolated. The distribution of temperature anomalies around 2200 (2181-2200) under two emissions scenarios using the FaIR simple climate model is in the bottom panel. To value lives lost or saved, in both panels we use the age-varying U.S. EPA VSL and an income elasticity of one applied to all impact regions.

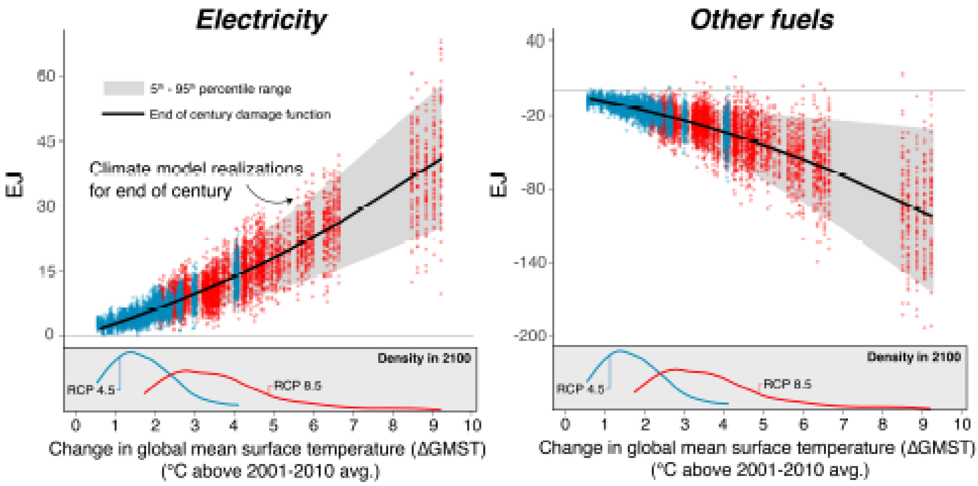

Figure 7: Empirically derived global energy damage functions Total global electricity consumption impacts (left) and other fuels consumption impacts (right) at end-of-century, indexed against ΔGMST realized in each climate model simulation (blue dots=RCP 4.5; red dots=RCP 8.5). Black lines represent end-of-century quadratic damage functions, which are estimated through the points shown. Shaded areas indicate the range between 5^{th} and 95^{th} percentiles. Probability density functions display the distribution of ΔGMST at end-of-century in each emissions scenario.

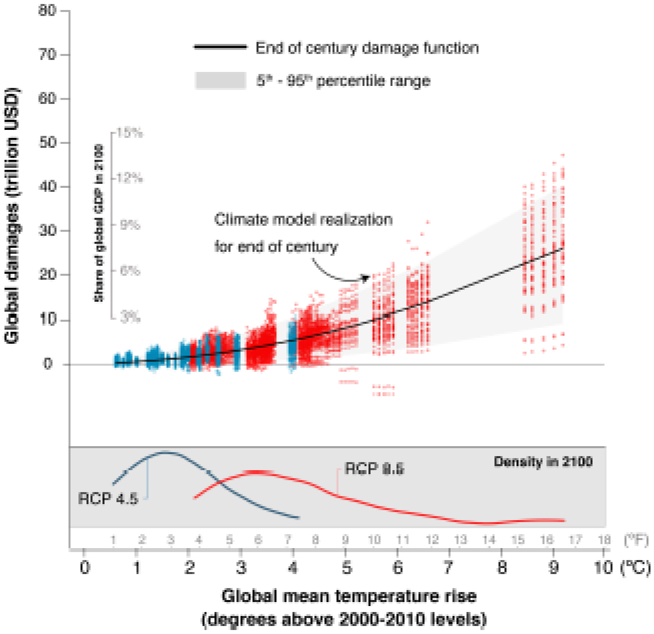

Figure 8: Empirically derived labor supply damage function The damage function above relates empirically derived total global labor disutility damages to anomalies in global mean surface temperature (ΔGMST) at end-of-century. Each point (red = RCP8.5, blue = RCP4.5) indicates the global labor disutility costs of climate change in a single year (ranging from 2095 to 2099) for a single simulation of a single climate model, accounting for changes to workforce composition as incomes grow and the climate warms. The black line represents the end-of-century quadratic damage function, which is estimated through the points shown. Shaded areas indicate the range between 5^{th} and 95^{th} percentiles. Probability density functions display the distribution of ΔGMST at end-of-century in each emissions scenario.

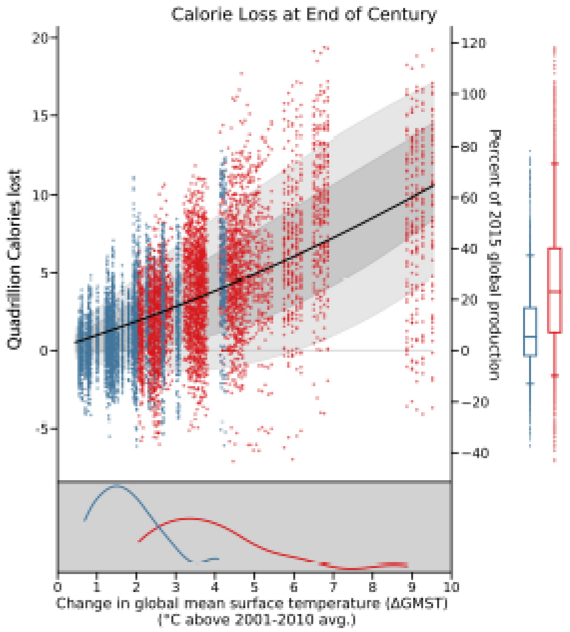

Figure 9: Empirically derived agriculture damage function Empirical damage function describing calories (kCal) lost as a quadratic function of the global mean surface temperature anomaly (Δ GMST). Each point represents a single climate-model-by-Monte-Carlo run for RCP 4.5 (blue) or RCP 8.5 (red) in 2093-2097. Grey bands indicate quantiles 10-90 and 25-75, conditional on Δ GMST. The bottom panel shows the distribution of warming under each RCP, boxplots to the right show the distribution of end-of-century damages by RCP. The right axis describes end-of-century caloric losses normalized by 2015 global caloric production of the six crops studied here (maize, soybean, rice, wheat, cassava, and sorghum).

Without having the codes used in estimating the damage function coefficients, it is impossible to check the accuracy of the estimates used to calculate the climate impacts associated with the Proposed Rule, including those in Tables 5 and 6 of the Proposed Rule.

We believe that the Proposed Rule fails to comply with the standards summarized in Part I of these comments, because the DSCIM model fails to include complete test data including input parameters and output results, as EPA itself requires of air quality models used by state agencies and regulated entities. Damage function coefficients are provided; however, the associated manner in which they are estimated is not. Damage function coefficients may significantly influence the SCCH4, and as a result, it is important that the codes involving their estimation be made available to the public.

Conclusion

The CAA requires that proposed rules provide sufficient information for independent verification of the models used in EPA rulemaking. The Proposed Rule fails to do provide that information and is therefore invalid. Moreover, given the strict requirements of CAA Section 307(d)(3), we note that this information deficiency cannot be cured in a final rule. Rather, the Proposed Rule must either be withdrawn or reissued for a new round of notice-and-comment with the information deficiency corrected.

Thank you for your consideration of these comments.

Respectfully submitted,

/s/

Kevin Dayaratna*
Chief Statistician, Data Scientist, and Senior Research Fellow
Center for Data Analysis
The Heritage Foundation

Mario Loyola*
Research Assistant Professor,
Florida International University
Senior Research Fellow,
Center for Energy, Climate, and Environment
The Heritage Foundation

*These comments represent our views and not necessarily those of the Heritage Foundation.

Attachment A
Correspondence with EPA Staff

[See following pages]

Re: DSCIM

Marten, Alex <Marten.Alex@epa.gov>

Wed 2/14/2024 9:53 AM

To:Dayaratna, Kevin <kevin.Dayaratna@heritage.org>
Cc:Kopits, Elizabeth <Kopits.Elizabeth@epa.gov>

Hi Kevin,

The empirical estimation of the underlying regional damage function coefficients is not part of DSCIM to my knowledge. That was done in the underlying studies by those research teams. The User Guide (Section 6.1) provides additional detail as to the DSCIM modeling process and what is included in DSCIM vs. DSCIM EPA (https://github.com/USEPA/scghg/blob/main/DSCIM/DSCIM_User_Manual.pdf). As noted there, "For efficiency and ease of replication for the EPA report, DSCIM-EPA begins computations from pre-computed RFF-SP damage function coefficients." As further described in the guide, developing those pre-computed certainty equivalent damage function coefficients involves local climate damage projections based on the ~25,000 regional damage functions taking into account parametric uncertainty, calculation of the local welfare costs of climate change, climate damage aggregation, and damage function estimation in each future year. Those, and the first in particular, are the computational intensive activities. If you're interested in going back further in the modeling process than DSCIM EPA, you should check out the broader DSCIM code base (https://github.com/ClimateImpactLab/dscim) made available by the Climate Impact Lab.

--
Alex Marten
phone: (202) 566-2301
email: marten.alex@epa.gov

From: Dayaratna, Kevin <kevin.Dayaratna@heritage.org>
Sent: Tuesday, February 13, 2024 4:10 PM
To: Marten, Alex <Marten.Alex@epa.gov>
Cc: Kopits, Elizabeth <Kopits.Elizabeth@epa.gov>
Subject: Re: DSCIM

> **Caution:** This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Thanks, Alex.

So are you saying that the first step involved estimating (in an HPCC environment) the regression coefficients that went into the damage function (among other things)? I have access to my own HPCC environment and would be interested in tweaking the associated codes. Where can I download these codes along with documentation to do so?

Kevin Dayaratna, Ph.D.
Chief Statistician, Data Scientist, and Senior Research Fellow, Center for Data Analysis

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Washington, DC 20002
202-608-1540
heritage.org

From: Marten, Alex <Marten.Alex@epa.gov>
Sent: Tuesday, February 13, 2024 2:45 PM
To: Dayaratna, Kevin <kevin.Dayaratna@heritage.org>
Cc: Kopits, Elizabeth <Kopits.Elizabeth@epa.gov>
Subject: Re: DSCIM

Hi Kevin,

Thanks for reaching out.

The DSCIM model is computationally intensive and therefore, it is run in two steps to improve tractability. In the first step, the empirical damage functions for around 25,000 regions globally are aggregated up to certainty equivalent global damage functions. This stage incorporates parametric uncertainty from the empirically estimated damage functions and is run in a high-performance computing environment. In the second step, the damage functions are combined with the climate modeling and socioeconomic scenarios and incorporates uncertainty associated with both. This is discussed in more detail in Appendix A.1 and A.2 of the DSCIM user manual (https://github.com/USEPA/scghg/blob/main/DSCIM/DSCIM_User_Manual.pdf).

Because the current estimates incorporate risk aversion, the certainty equivalent damage functions from the first step have to take that into account. In this modeling, risk aversion is based on the parameterization of the Ramsey formula. Therefore, the certainty equivalent damage becomes different across the Ramsey formula specifications that define the discount rates and risk aversion in the modeling.

The Climate Impact Lab conducted the first step in their high-performance computing environment. The code you reference pulls in the damage function specifications relevant for our report. I believe the broader DSCIM code base includes certainty equivalent damage functions for other parameterizations including for running constant discount rates (https://github.com/ClimateImpactLab/dscim). If you would like to develop new certainty equivalent global damage functions that are based on DSCIM and different specifications of the Ramsey formula, I would recommend reaching out to the Climate Impact Lab (https://impactlab.org/about/).

If you have any additional questions, please let us know.

--
Alex Marten
phone: (202) 566-2301
email: marten.alex@epa.gov

From: Dayaratna, Kevin <kevin.Dayaratna@heritage.org>
Sent: Monday, February 12, 2024 2:58 PM
To: Marten, Alex <Marten.Alex@epa.gov>
Subject: DSCIM

Alex:

Greetings. My name is Kevin Dayaratna. We corresponded several years ago regarding the social cost of carbon. Hope all is well. Are you still the point of contact regarding these models?

I am working on using the new SCC models (DSCIM/GIVE/Howard and Sterner metanalysis models) at Heritage. Regarding the DSCIM model, however, I have run into an issue. It appears that the coefficients of the damage functions vary depending upon the discount rates being used.

So, in that case if one would like to re-estimate the SCC in DSCIM under alternative discount rate specifications, then how would he/she alter these coefficients to do so? The code available doesn't seem to be able to do this. It appears that someone else had this same question online, but unfortunately, there has not been a response.

https://github.com/ClimateImpactLab/dscim-epa/issues/28

Kevin

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